

# Production Technology of Onion

Bengali name: পিঁয়াজ

English Name: Onion.

Scientific Name: *Allium cepa*.

Family: Alliaceae.

Onion is an almost indispensable spices and a vegetable at the same time. It is originated from China. But it is not clear when at first the cultivation of onion started in Bangladesh. However, the major onion producing districts of Bangladesh are Faridpur, Rangpur, Dhaka, Mymensingh, Rajshahi and Pabna.

## Variety

**A. Local variety-** Taherpuri, Faridpur vati, Jhitka, Kalash nagar, Salta etc.

**B. BARI released variety-** BARI Piaz-1 (winter onion), BARI piaz-2 (summer onion), BARI piaz-3 (summer onion), BARI piaz-4, BARI piaz-5.

## Climatic Requirements

- Onion is a thermo and photo sensitive plant. It required different day length and light in different growth stage.
- **Temperature-**
  - For good vegetative growth 15-20<sup>0</sup> C.
  - for bulbing 10 + 2<sup>0</sup> or 10-2<sup>0</sup> C.
  - for bulb maturity stage < 20<sup>0</sup> C are required.
- **Relative Humidity-** It requires 70% relative humidity for good growth.
- **Rainfall-** Onion does not thrive well in places, where the average rainfall exceeds 75-100 cm in monsoon period.
- **Soil-** *Sandy loam* and *loamy soil* with rich humus and good drainage condition is best for onion cultivation. The optimum p<sup>H</sup> range is about → 5.8-6.5.

## Land Preparation

The field is plough to a fine tilth by giving 4-5 ploughing with sufficient interval. The planting should be done after proper levelling.

## Production / Cultivation Method

1. Propagation by true seed.
2. Propagation by small bulb.

**1. Seed to bulb method-** Seed is cultivated by sowing or transplanting method.

**A. Sowing-** About 3-5% onion are produced by this method in Bangladesh.

- **Seed rate-** 5-6 kg/ha.
- **Sowing time-** *September - October* and is harvested in *March*.

**B. Transplanting-** About 80-89% onion are cultivated by this method in Bangladesh.

- **Seed rate-** 2.5-3 kg/ha.
- **Transplanting time-** Early planting is done in *October - November* and is harvested in *April*.

**2. Bulb to bulb method-** In our country, near about 10 -12% onion is produced in this method. It is widely used in seed production.

- **Seed rate-** 1000-1500 kg/ha. It takes less time about 2-2.5 month.
- **Planting time-** off season.
- **Spacing-** Mainly depend on cultivar, time of planting, method of planting, soil fertility etc. Generally, it is kept *15 cm for row-row* and *15 cm for plant-plant*.

### **Manures and Fertilizer Application** (According to BARI)

The following doses of manures and fertilizers should be applied in the onion field-

Well decomposed cowdung- 8-10 ton/ha.

Urea- 250 kg/ha.

TSP- 275 kg/ha.

MoP- 150 kg/ha.

Borax- 5 kg.

**Method of application-** Cowdung and TSP should be applied before land preparation. Urea and MoP should be applied at 2 equal splits. 30 and 60 DAT as a top dressing.

### **Intercultural Operation**

- The flower should be broken, otherwise the onion can not increase in size.
- **Weeding-** As and when necessary.
- **Mulching-** As and when necessary.
- **Irrigation-** One irrigation is necessary immediately after transplanting. Generally in *kharif* season 8-10 and *Rabi* season 15-20 irrigation are given. Before 1 month of harvesting irrigation is stopped.

## Control of Insects and Disease

### Insect

- i. **Mole cricket and field cricket**- Killed them by flood irrigation.
- ii. **Thrips and Aphids**- Spray **Malathion 57 EC @ 2 ml/L** of water.

### Disease-

- I. **Purple leaf blotch** disease- Leaf becomes yellow. Control by using **Copper fungicides**.
- II. **Yellow Mosaic**- Spread by white fly. Prevent this disease by applying **proper Insecticides**.

## Harvesting

Best time for harvest onion when 35% leaf neck fall, 20-25% leaves become yellow colour and tops starts drying then the bulbs are harvested by following proper way of cutting.

## Yield

The average yield is 10-15 ton/hectare.

## Production Technology of Garlic

Bengali Name: রসুন

English Name: Garlic.

Scientific Name: *Allium sativum*.

Family: Alliaceae.

**Origin:** Central China.

### Use of garlic

- It is an important spices crops. We eat it's clove.
- It breaks the cholesterol of body.
- Contain non-protein amino acid (allecine).
- Used as medicine.

## Climatic Requirements

It is grown well in cool climate with dry weather. Both temperature and day length influences the growth and development of garlic.

### A. Temperature: (Tropical variety)

- It germinate above 20<sup>0</sup> C temperature and then produce 4-5 leaf.
- Pre-vegetative stage temperature is 15-20<sup>0</sup> C, leaves produces within 30-60 days.
- About 5-10<sup>0</sup> C, clove initiation occurs within 60-90 days.
- Above 20<sup>0</sup> C temperature need for maturity stage.

### B. Day Length

- For *tropical* variety day length is *neutral*.
- For *temperate* variety *16 hours* is the critical day length.

**Soil-** Soil should be well drained, fertile and sandy to sandy loam with high organic matter. The P<sup>H</sup> of soil is about 6.5-7.8.

### Variety

Lalshil, Shadashil, Pabni, Patni etc.

### Land Preparation

The land is ploughed to a fine tilth by giving 5-6 ploughing with sufficient interval. The laddering should be done for proper levelling and loosening.

### Methods of Planting

Garlic is planted through cloves either by *dibbling* or by *furrow* planting.

**1. Dibbling-** Fields are divided into small plots convenient for irrigation. Cloves are dibbled 5.0-7.5 cm deep keeping their growing ends upward.

**2. Furrow planting-** Furrows are prepared with hand hoe. The cloves are dropped on the furrows by hand. These are their covered with lightly loose soil.

### Cloves size and rate

About 500 kg cloves of 8-10 mm diameter are required to plant one hectare land.

**Spacing-** It is depend on planting time, soil fertility, production technology and variety. Generally, spacing followed at 15 cm X 10 cm for common practice.

**Time of planting-** It is planted during *Mid October - mid November*.

## Manures and Fertilizer (According to BARI)

The following doses of manures and fertilizers should be applied in the garlic field-

Well decomposed cowdung- 5 ton/ha

Urea- 217 kg/ha.

TSP- 267 kg/ha.

MoP- 333 kg/ha.

Gypsum- 110 kg.

**Method of Application-** During land preparation total amount of CD and there after 1/2 urea, should be applied. After 30 and 60 DAP, the rest amount of urea and total amount of TSP and MoP should be applied at 2 equal splits as a top dressing.

## Intercultural Operation

Garlic is a shallow rooted crop and 2-3 shallow weeding and hoeing are done.

**Irrigation-** Generally, 3 irrigation are given at 30 days interval. Before 1 month if harvesting, irrigation is stopped.

## Control of Insects and Disease (same as onion)

### Insect

- i. **Mole cricket and field cricket-** Killed them by flood irrigation.
- ii. **Thrips and Aphids-** Spray **Malathion 57 EC @ 2 ml/L** of water.

### Disease-

- I. **Purple leaf blotch** disease- Leaf becomes yellow. Control by using **Copper fungicides**.
- II. **Yellow Mosaic-** Spread by white fly. Prevent this disease by applying **proper Insecticides**.

## Harvesting

The crop is ready for harvesting when tops turn *yellowish or brownish* and show signs of drying up and bend over. The bulbs of garlic are harvested in the month of *March to April*.

## Yield

10-15 ton/ha but our country 3-4 ton/ha.

# Production Technology of Ginger

Scientific Name: *Zingiber officinales*.

Family: Zingiberaceae.

## Origin and Distribution

It is originated from South East Asia. Somebodies, believe that it may be originated from West Indies. Jamaica is known as the land of Ginger. Madagascar, Spain, West Africa, Indonesia are the major producing countries. In our country Chittagong hill tract, Rangpur, Madhupur are the major producing district.

## Uses

1. Ginger has been used in Asia since ancient time.
2. Besides, used as spices, in western countries. Ginger is used as culinary purposes in Ginger bread, cake, biscuit, pickles, candy etc.
3. It is used in the production of Ginger brandy, Ginger wine, Ginger beer etc.
4. It is also used in herbal medicine.
5. It is also used in food preservation.
6. In USA and other European countries dehydrated zinger is used as chewing purpose.
7. It helps in digestion and asthmatic problem.

## Climatic Requirements

Normally, Ginger grows well in tropical and subtropical zone. Hot and humid climate is suitable for ginger production.

- **Temperature-** Growth increases above 25-45<sup>0</sup> C. At 15<sup>0</sup> C growth is restricted. It is a light shade loving crop.
- **Humidity-** Required relative humidity 80%.
- **Rainfall-** Annual rain fall 200-450 mm.
- **Soil-** Well drained soil is the best for ginger cultivation. *Sandy loam* to *loamy* soil is the best suited. Suitable P<sup>H</sup> 6.5-7.8.

## Variety

In Bangladesh there is no predominant variety. Farmers grow local traditional varieties.

**Local Varieties-** Rangpuri, Khulna, Tanguri, Nilphamari, Syedpuri etc.

**Import Varieties-** Nadia, Maran, Erand, Suprava, Suruchi, Suravi, Kochin, Gold Jamica etc.

## Preparation of Land

The land is to be ploughed thoroughly to bring the soil fine tilth weeds, stubbles, roots etc are removed. Beds of about, 1m width and 14 cm high.

## Planting Time

It is usually planted from ***March - May***.

**Spacing-** Line - line: 60-70 cm.

Plant - plant: 25-30 cm.

**Propagating Materials-** Ginger is always propagated by rhizomes. Carefully preserved seed rhizomes are cut into small pieces of 2.5 - 5 cm length and 20 - 25 gm weight and each having one or two good buds.

**Seed rate-** The seed rate varies from 1200 - 1500 kg/ha. The seed rhizomes treated with ***0.3% Dithane M-45***.

**Planting method-** It is planted by flat and ridge method. Planting depth 5-6 cm.

## Manures and Fertilizers (According to BARI)

Cowdung- 5-10 ton/ha.

Urea- 300 kg/ha.

TSP- 270 kg/ha.

MoP- 230 kg/ha.

Zinc- 3 kg/ha.

Gypsum- 110 kg/ha.

Whole amount of cowdung and 1/2 TSP should be applied during final land preparation. Rest 50% TSP should be applied after 80% emergence as side dressing Urea and MoP should be applied into 3 splits at the time of emergence, 2<sup>nd</sup> one month after emergence and last one is 3 month after emergence.

## Intercultural Operations

**Irrigation-** When rainfall is limiting, irrigation is done after 4-5 lines, deep drain should be provided with connecting drain.

**Weeding-** When necessary, then done.

**Earthing up-** Rows are needed to be earthed up ***once or twice***.

**Mulching-** Mulching the beds with green leaves is an important operation for Ginger. Besides, a source of organic matter, mulching prevents washing of soil and conserve soil moisture.

1<sup>st</sup> mulching done at the time of planting. 2<sup>nd</sup> mulching done at 80-90 day of sowing.

## Plant Protection

Pest and Disease	Symptoms	Control Measure
<b>Shoot borer</b>	1. Larvae bore into the pseudo stem and feed on growing shoot. 2. Yellowing and drying of infested shoot.	Spray <b>Malathion 0.15%</b> during <i>July-October</i> at monthly interval.
<b>Leaf roller</b>	Rolls the leaves and feed on them.	Spraying <b>Carbaril 0.1%</b> at 15-20 days interval.
<b>Rhizomes scale</b>	Infests rhizomes, feed on plant sap causes withering.	Dip the seed rhizomes in <b>Quinalphos 0.1%</b> <i>twice</i> prior to storage a sowing
<b>Soft rot or Rhizome rot</b>	1. Collar region exhibits rotting and spread to rhizome and roots. 2. Leaves exhibit yellowing symptoms.	1. Provide good drainage and select healthy, disease free rhizomes. 2. drench the bed with 0.3% <b>Diathane M-45</b> . 3. Add <b>neem cake</b> 2 ton/ha.

## Harvesting

Harvesting is done 8-10 month after planting, when the leaves begin to yellow and the stem lodge. For manufacture of preserved Ginger, the rhizomes are harvested before fully mature. The crop is normally harvested by hand.

## Yield

- 20-25 ton/ha in our country.
- 60 ton/ha in West Indies and Spain.

## Production Technology of Turmeric

English Name: Turmeric.

Scientific Name: *Curcuma longa*.

Family: Zingiberaceae.

Turmeric is the most important spices of tropics and is cultivated from ancient time. There are 4 important species in curcuma is given below-

- Curcuma longa***: Widely cultivated type.
- C. aromatica***: Popularly known as *Cochin* turmeric or *Kasturi* turmeric.
- C. angustifolia***: Wild species having plenty starch in rhizomes.
- C. amada***: Known as *mango ginger*.



## Origin and Distribution

Indo-China, South pacific Island. Now it is introduced widely in most tropics and sub-tropics. Bangladesh, India, Srilanka, Mozambique, Madagascar are turmeric producing countries. In our country Rajshahi, Rangpur, Pabna, Khustia, Jessor, Chittagong.

## Uses

1. It is used as an important yellow dye. It can be used for dying cotton, silk, wool etc.
2. Turmeric powder and water used as cosmetics.
3. Used as preservation and colouring matter in cheese and other food stuffs.
4. Turmeric is also used as medicine in Ayurvedic and Unani.
5. It is claimed to be stomachic, toxic blood purifier, anthelmintic, antacid, anti periodic.
6. Used as different occasion like 'gaye holud'.
7. Considerable amount of turmeric converted as kumkum.
8. It is preventive against skin infection.

## Climatic Requirements

Normally, Turmeric grows well in tropical and subtropical zone. Hot and humid climate is suitable for turmeric production.

- **Temperature-** Growth increases above 25-45<sup>0</sup> C. At 15<sup>0</sup> C growth is restricted. It is a light shade loving crop.
- **Humidity-** Required relative humidity 80%.
- **Rainfall-** Annual rain fall 200-450 mm.

**Soil-** Well drained soil is the best for turmeric cultivation. *Sandy loam* to *loamy* soil is the best suited. Suitable P<sup>H</sup> 6.5-7.8.

## Variety

There are 2 types-

### 1. Cultivers : Introduced by BARI-

- BARI turmeric-1 (Dimla), *Yield-* 17-18 ton/ha, Deep yellow colour
- BARI turmeric-2 (Sinduri), *Yield-* 12-13 ton/ha, Deep yellow colour
- BARI turmeric-3, *Yield-* 25-30 ton/ha, Deep yellow colour.
- BARI turmeric- 4 & BARI turmeric-5.

**2. Local Variety-** Arani, Mahish bhut, Harinpalli, Adagati.

### **Preparation of Land**

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### **Planting Time**

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**Spacing-** Line - line: 60-70 cm.

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**Propagating Materials-** turmeric is always propagated by rhizomes. Carefully preserved seed rhizomes are cut into small pieces of 2.5 - 5 cm length and 20 - 25 gm weight and each having one or two good buds.

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MoP- 233 kg/ha.

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### **Intercultural Operations**

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**Weeding-** When necessary, then done.

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<b>Soft rot or Rhizome rot</b>	3. Collar region exhibits rotting and spread to rhizome and roots. 4. Leaves exhibit yellowing symptoms.	4. Provide good drainage and select healthy, disease free rhizomes. 5. drench the bed with 0.3% <b>Diathane M-45</b> . 6. Add <b>neem cake</b> 2 ton/ha.

## Harvesting

Harvesting is done 8-10 month after planting, when the leaves begin to yellow and the stem lodge. For manufacture of preserved turmeric, the rhizomes are harvested before fully mature. The crop is normally harvested by hand.

**Yield-** 20-25 ton/ha.

**Mahbubul Alam**

**CST- 06<sup>th</sup> Batch**

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